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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,930	10/29/2001	Heikyung Min	100-16800	8013

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EXAMINER

LE, DUNG ANH

ART UNIT PAPER NUMBER

2818

DATE MAILED: 09/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/032,930

Applicant(s)

MIN ET AL.

Examiner

DUNG A LE

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 10-12 is/are rejected.
- 7) ☒ Claim(s) 7-9 and 13-15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

## DETAILED ACTION

### *Oath/Declaration*

The oath/declaration filed on 10/29/2001 is acceptable.

### *Election/Restriction*

Examiner confirms that Applicants elected to prosecute Claims 1- 15 and have withdrawn Claims 16-20 without traverse.

Applicants have the right to file a divisional, continuation or continuation-in-part application covering the subject matter of the non-elected claims 16-20.

### *Information Disclosure Statement*

This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on October 29, 2001 and made of record as Paper No. 2. The references cited on the PTOL 1449 form have been considered.

### *Specification*

The specification is objected to for the following reason:

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed (see MPEP § 606.01).

A title such as --APPARATUS FOR REDUCING SURFACE ZENER DRIFT USING TI-BASED METALLURGY-- is suggested. Note that, the claims are directed to semiconductor device instead of to a method of making a semiconductor device.

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Objections***

In claim 1, lines 12, 16 and 26, amend the term 'a layer of isolation material ' to -- a first layer of isolation material -- ; line 18,19 and 21, amend "a layer of isolation material" to -- a second layer of isolation material --; lines 22-23, amend "the conductive via" to --conductive contact. ( e.g. a conductive contact (216) and conductive via ( 226) ) and in claim 10, line 6, amend " the conductive via " to --the conductive contact-- in order to particularly define the subject matter which Applicants regard as the invention.

### **Claim Rejections**

#### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject

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matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-6 and 10-12 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Thomas et al. (5117276) in view of The Background of the Invention and for the reasons set forth in the remarks..**

Thomas et al. disclose a semiconductor structure formed in a semiconductor material, the semiconductor structure comprising:

a layer of isolation material 14 formed on the semiconductor material 12; a conductive contact 216 formed through the layer of isolation material 14 to make an electrical contact 216 with the first region 12 (column 6, lines 25-30); a first metal trace 38 formed over the layer of isolation material 14 and the conductive contact 216 (fig. 1L);

a layer of insulation material 42 formed on the first metal trace 38; a conductive via 50 formed through the layer of insulation material 42 to make an electrical contact with the first metal trace 38 (Fig. 2B);

a second metal trace 54 formed on the layer of insulation material 42 and the conductive via 50 to make an electrical contact with the conductive via 26; a layer of passivation material formed over the second metal trace 54, and a titanium protection layer 34 (fig. 1K) formed over the layer of isolation material 14 and the conductive contact 26.

Thomas et al. do not disclose a first region of the first conductivity type formed in the semiconductor material, the first region having a dopant concentration that is greater than the dopant concentration of the semiconductor material; a second region of a second conductivity type formed in the semiconductor material to adjoin the first region and the layer of passivation material including nitride on top of the device.

The Background of the Invention teach a first region of the first conductivity type formed in the semiconductor material, the first region having a dopant concentration that is greater than the dopant concentration of the semiconductor material; a second region of a second conductivity type formed in the semiconductor material to adjoin the first region.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct interconnect system of Thomas on top of the device The Background of the Invention' s device, in order to provide a semiconductor integrated circuit structure having a high performance, high speed interconnect system.

Thomas et al. and The Background of the Invention fail to disclosed the layer of passivation material including nitride on top of the device.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the layer of passivation material including nitride on top of the device because the nitride passivation material is commonly used to prevent undesirable reactions in the contact region and for device protection, since it has been



held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

**Regarding claim 2,** The Background of the Invention teach the first region is biased with a first voltage and the second region is biased with a second voltage, the first voltage being greater than the second voltage.

**Regarding claim 3,** Thomas et al. show the titanium protection layer 34 includes an element from the list of titanium, titanium-tungsten, and titanium metal silicides (col 8, lines 9-10).

**Regarding claim 4,** Thomas et al. show the titanium protection layer is formed on the isolation layer 14 and the conductive contact under the first metal trace 38 (fig. 1I).

**Regarding claim 5,** The Background of the Invention show the first region is biased with a first voltage and the second region is biased with a second voltage, the first voltage being greater than the second voltage.

**Regarding claim 6,** Thomas et al. teach the titanium protection layer includes an element from the list of titanium, titanium-tungsten, and titanium metal silicides (col 8, lines 9-10).

**Regarding claim 10,** Thomas et al teach the titanium protection layer 34 is formed on the insulation layer 14 and the conductive via 26 under the second metal trace 38 (fig. 1I).

**Regarding claim 11,** The Background of the Invention the first region is biased with a first voltage and the second region is biased with a second voltage, the first voltage being greater than the second voltage.

**Regarding claim 12,** The apparatus of claim 10 wherein the titanium protection layer includes an element from the list of titanium, titanium-tungsten, and titanium metal silicides (col 8, lines 9-10).

***Allowable Subject Matter***

**Claims 7-9 and 13-15 are objected** to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. --Thomas et al. (U.S. Patent No. 5117276) and The Background of the Invention , taken individually or in combination, do not teach the claimed invention having the titanium protection layer is formed on and over the first metal trace (Regarding claim 7) and the titanium protection layer is formed on and over the second metal trace (Regarding claim 13).

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.



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A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is 703-306-5797. The examiner can normally be reached on Monday-Friday 8:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 703-308-4910. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Dung A. Le



Date: 7-02

Dung A. Le



Examiner

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